3. OU 4-13 REMEDIAL INVESTIGATION AND WAG 4 REMOVAL ACTIONS

This section presents the precision, accuracy, representativeness, and completeness of data used in the BRA (human health risk assessment). These parameters were evaluated for data collected from the OU 4-13 field investigation at sites CFA-04 and CFA-08 and at the 1997 Miscellaneous Sites Non-time Critical Removal Action. Additional background information on specific sites may be found in Section 4 of this report.

3.1 CFA-04 Pond

The objectives of the field investigation at the CFA-04 Pond were to determine:

1. The mean and maximum concentrations of the COPCs
2. The extent of contamination
3. If leaks from the pipe from building CFA-674 to the pond occurred and were a source of contamination
4. If subsurface geophysical anomalies were sources of contamination
5. The topographical features of the pond for use in evaluating remedial activities.

The first objective was met by collecting enough samples in and around the pond to ensure that a comparison could be made with background concentrations (see Figure 3-1). Samples were collected in accordance with the Field Sampling Plan (FSP) (Blackmore 1997a). The number of samples for each analyses was determined in the OU 4-13 SAP (Blackmore 1997a) by applying statistical tests to data from previous investigations. These tests were performed to ensure that enough samples were collected to determine the mean and maximum concentrations. The number of samples for each contaminant were calculated as follows: mercury—29, arsenic—3, U-235—13, and U-238—13.

The second, third, and fourth objectives were met by collecting samples from: random locations in the pond area, locations near the pipeline, locations in the windblown areas, and locations in the geophysical anomalies. The random pond area locations were collected based on the statistical analysis of data collected prior to this RI. The pipeline locations were collected to determine if the pipeline had leaked and caused contamination of the surrounding soil. The windblown samples were collected to determine whether or not calcine in the pond had been transported by wind to surface soils surrounding the pond. Samples from the geophysical anomalies were collected to determine if contaminants were released to the anomaly areas.

The fifth objective was met with the completion of a topographic survey of the pond and surrounding area. The purpose of the survey was to produce a topographic map that would support future remedial plans for the pond.

Mercury Retort Area Sampling—1997. Additional data were collected in November 1997 in the staging area, which was used for retort equipment and tanks, and waste storage (Figure 3-2). The objective of this sampling activity was to determine whether soil contamination occurred as a result of equipment operation and water storage. This objective was met with the collection of 48 samples from

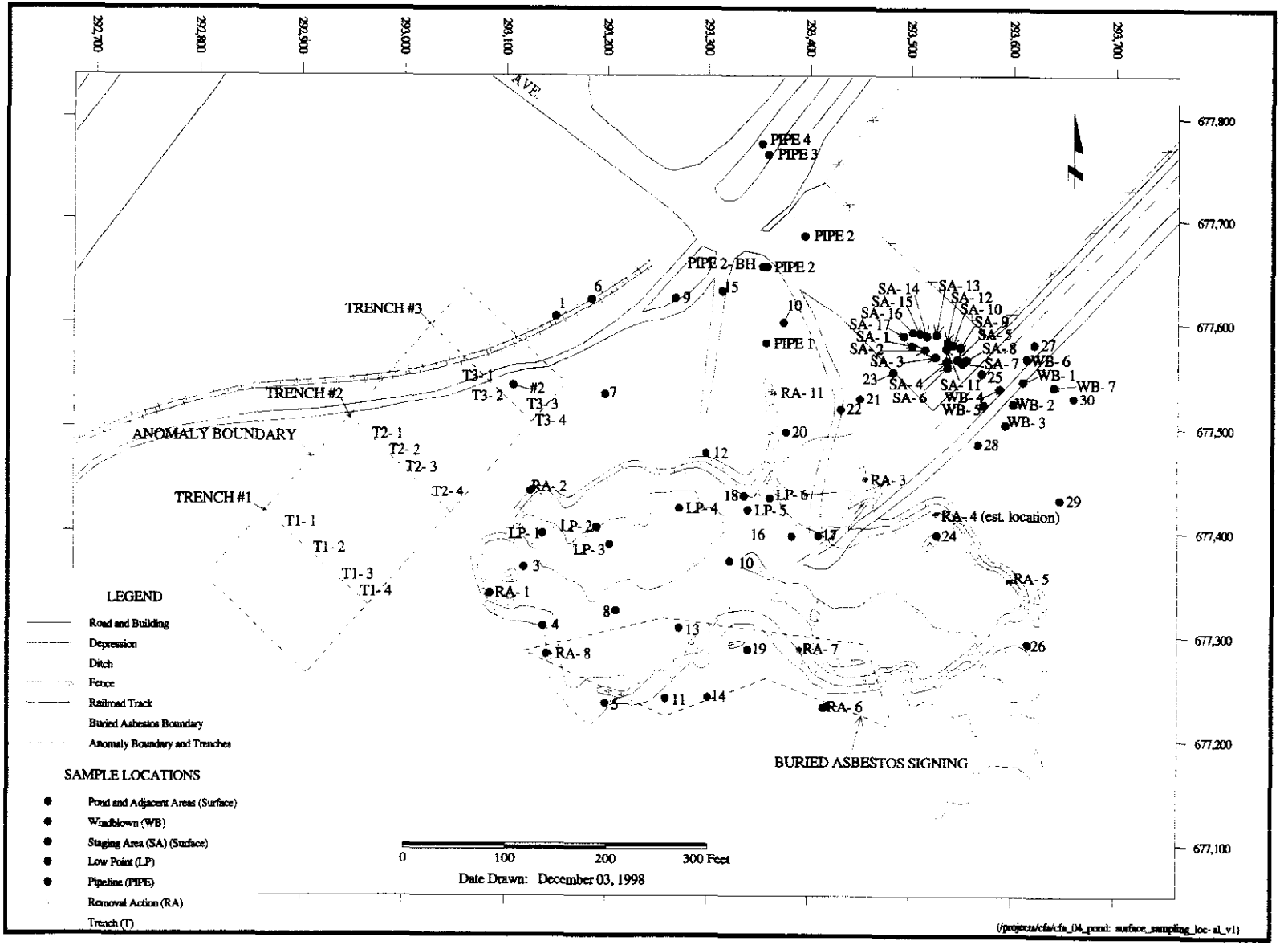

Figure 3-1. Sample locations at CFA-04 Pond (1995–1997).

45 locations (3 duplicates) in the staging area. The samples were analyzed for metals (including mercury), gamma-emitting and uranium radionuclides, nitrate/nitrite, and TCLP metals. No critical samples were designated.

OU 4-13 RI/FS Sampling—1998. Additional data were collected during July 1998 to refine the type and volume of contaminated soil in the pond (Figure 3-2). The specific objectives were to:

1. Determine the hazardous waste status of previous sampling locations in the pond bottom where mercury was detected. This included determining whether "hot spot" or "cold spot" locations pass of fail TCLP analysis.

2. Determine the extent of mercury contamination above the PRG to a depth of 1m (3 ft) below the bottom of the pond.

3. Determine the rad added status of the pond sediments using TPR-713 analysis.

These objectives were met with the collection of 96 samples (including 4 duplicates) from different depths at 40 locations. No critical samples were identified for this sampling activity.

3.2 CFA-08 Drainfield

The objectives of sampling at the CFA-08 Drainfield were to determine:

1. The mean and maximum activity of Cs-137 in the surface and subsurface soils of the drainfield

2. The vertical and lateral extent of subsurface contamination at the alluvium-basalt interface adjacent to the drainfield

3. The topographical features of the drainfield for use in evaluating remedial alternatives

4. The extent of potential contamination from the delivery pipelines and the nature of waste in the pipelines.

5. The presence or absence of potential contamination beneath the STP structures.

The first objective was met by collecting enough surface and subsurface soil samples from locations randomly located in the drainfield. Samples were collected in accordance with the FSP (Blackmore 1997a). The number of samples for each specific analysis was determined in the OU 4-13 SAP (Blackmore 1997a) by applying statistical tests to data from previous investigations. These tests were performed to ensure that enough samples were collected to determine the mean and maximum concentrations. The tests resulted in the following number of samples for each contaminant: arsenic–3, Cs-137-6, and U-235/8–13. Samples were analyzed for uranium isotopes because these were known contaminants.

The second objective was met by collecting soil samples from twenty boreholes located just outside boundary of drainfield (see Figure 3-3). Biased borehole samples were collected at depths ranging from 0 to 4, 4 to 8, 12 to 16, and at the soil-basalt interface at approximately 18 to 27 ft. This

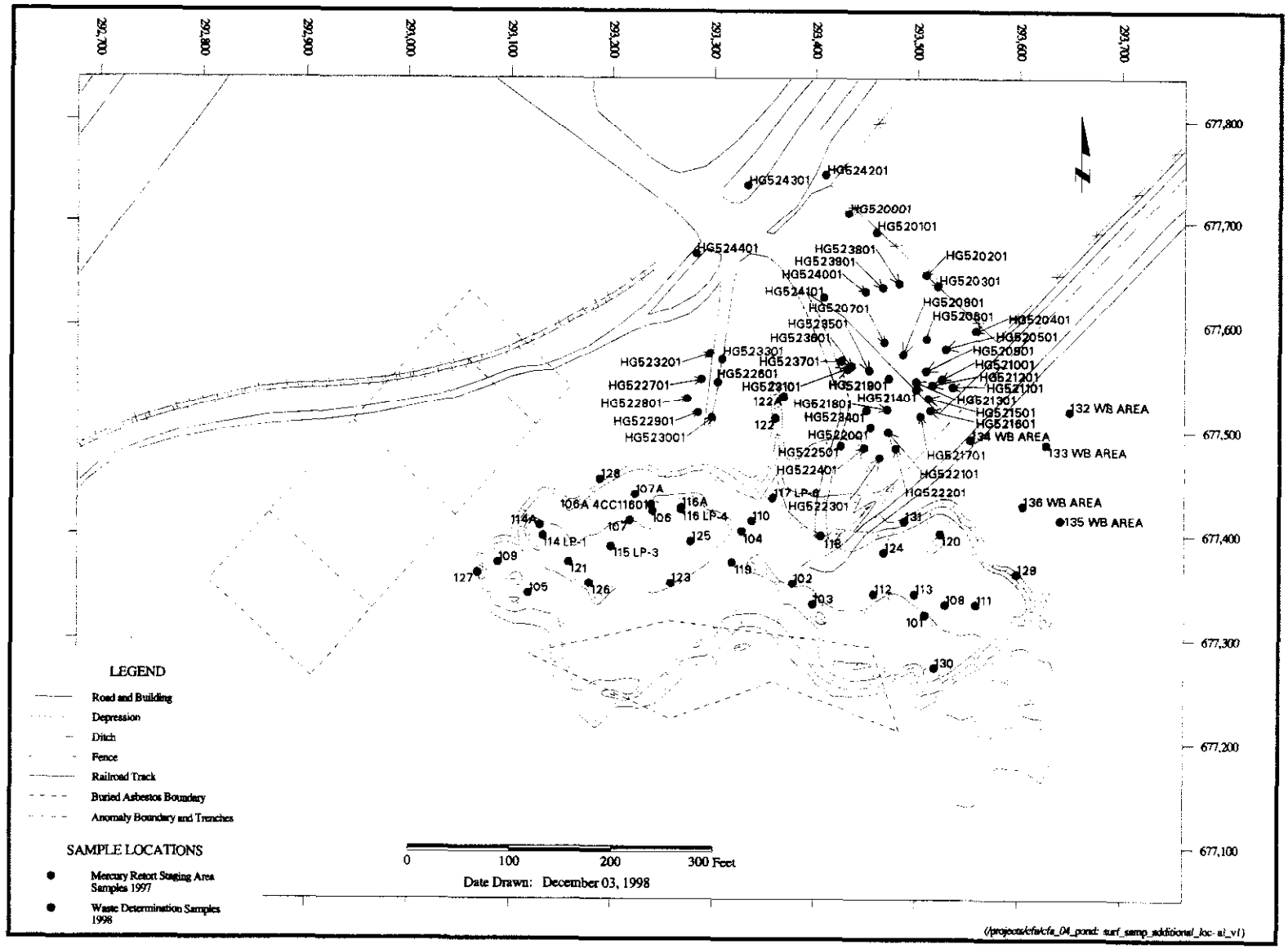

Figure 3-2. Sample locations at CFA-04 pond (1997 and 1998).

involved using positive detections of Sr-90 as an indicator of lateral migration of contaminants from the drainfield. An estimate of lateral migration of radionuclides toward the aquifer was made in the RI/FS Work Plan (McCormick 1995) as part of a source term evaluation using data from the Track 2 investigation. The Track 2 risk assessment indicated that the primary sources of potential risks are radionuclides, especially Cs-137, in the surface soils of the drainfield. The Track 2 data also indicated that Cs-137 and other radionuclides are predominately in the surface soils. The other COPCs (both rads and non-rads) for which samples were collected in the drainfield showed only sporadic detections at depth with the exception of Sr-90. While Sr-90 is not the most mobile of the COPCs found in the drainfield, it did show much higher and more consistent detections at depth than the other COPCs. The objective of the RI/FS drainfield boreholes was to determine the lateral extent of contamination outside of the drainfield. The Track 2 data indicated that no significant contamination existed directly beneath the drainfield, the COPC with the most mobility in the perched water zone was chosen as an indicator of whether or not contamination had moved laterally along the soil-basalt interface.

Samples were analyzed for Sr-90 at the Radiation Measurements Laboratory (RML) at the INEEL. Analyses for other COPCs from a particular borehole location were performed only if Sr-90 was positively detected. As a result of this process additional samples were collected at only one of twenty drainfield boreholes.

The third objective was met by performing a topographic survey of the drainfield and surrounding area. All sample locations were surveyed and plotted on a topographic map.

The fourth objective was met by collection of samples from the pipeline sludge and from the soils surrounding the pipelines.

The fifth objective was met with collection of samples beneath the STP. The D&D program investigated potential releases from the components of the sewage treatment plan in 1996 (Stormberg 1996). The objective of the investigation was to characterize potential releases from the plant at the soil-basalt interface. Subsurface soil samples were collected from boreholes and analyzed for metals, radionuclides, and SVOCs (see Figure 3-4). The borehole locations were biased toward areas with the greatest potential for leakage from the plant. The boreholes were located next to the concrete structures that held large volumes of water and close to underground piping where leakage might be expected. The twelve borehole locations were completed and all samples were collected and analyzed. Additional data were collected in 1998 from beneath the structures to determine the hazardous waste status for metals. In addition, field instrument surveys to detect possible releases of radiological contaminants were conducted on the soils after removal of structures and piping.

Analytical data from 1996 and 1998 indicate the presence of U-235 and Ra-226 in samples from the boreholes beneath the plant. All other potential contaminants (VOCs, SVOCs, PCBs, radionuclides, and metals) were not detected or detected below background and/or risk-based concentrations (see Appendix C for screening). Analysis of samples for TCLP in the completeness results for these data are included in Table 3-2.

3.3 CFA-10 Transformer Yard Oil Spills

Data were collected at the CFA-10 Transformer Yard Oil Spills site during July 1998 (Figure 3-5). The objectives of this sampling activity were to:

1. Determine the presence, or absence, of lead contamination above 400-mg/kg at depths of 0.61 m (2 ft).

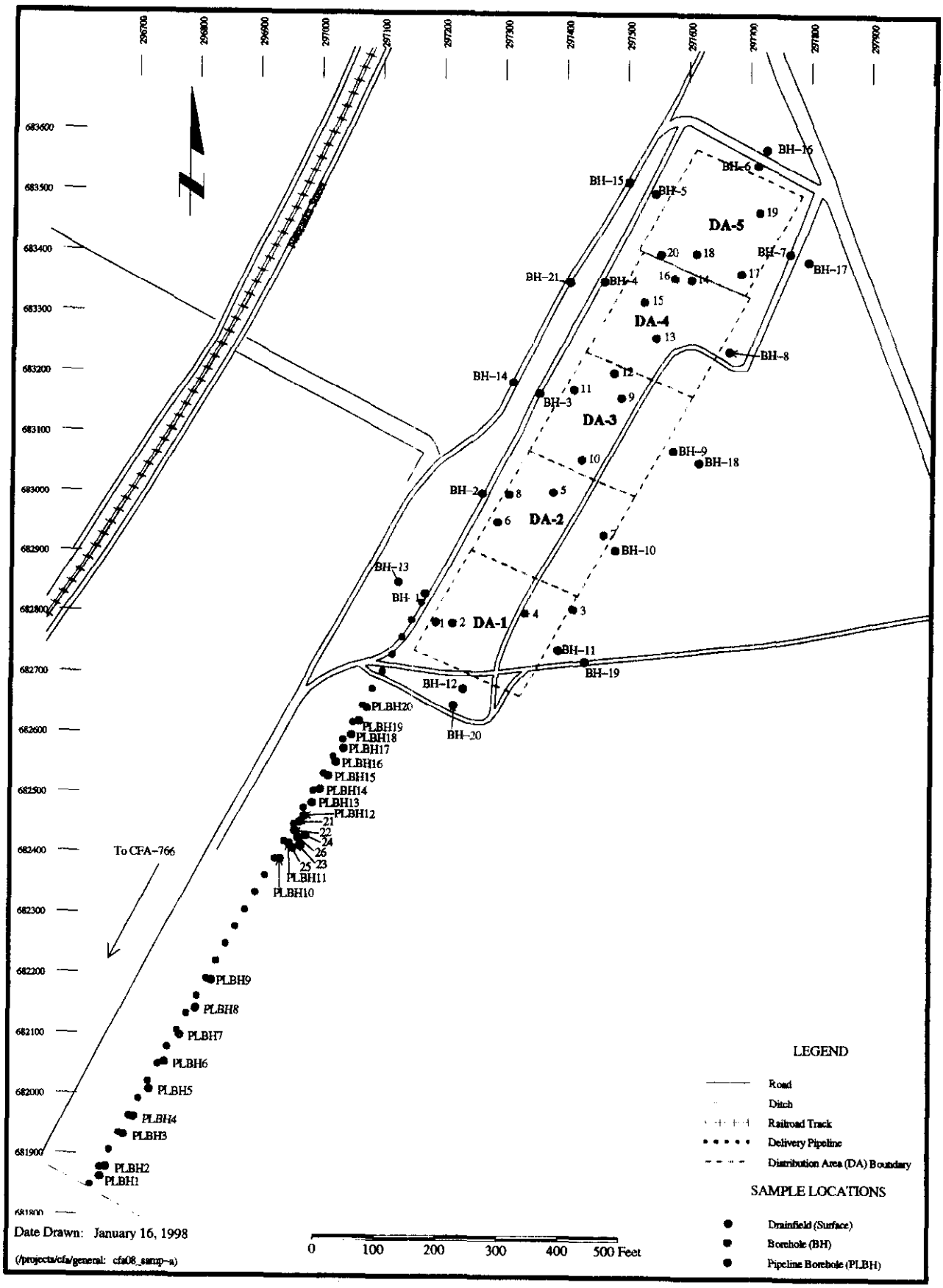

Figure 3-3. Sample locations at the Drainfield.

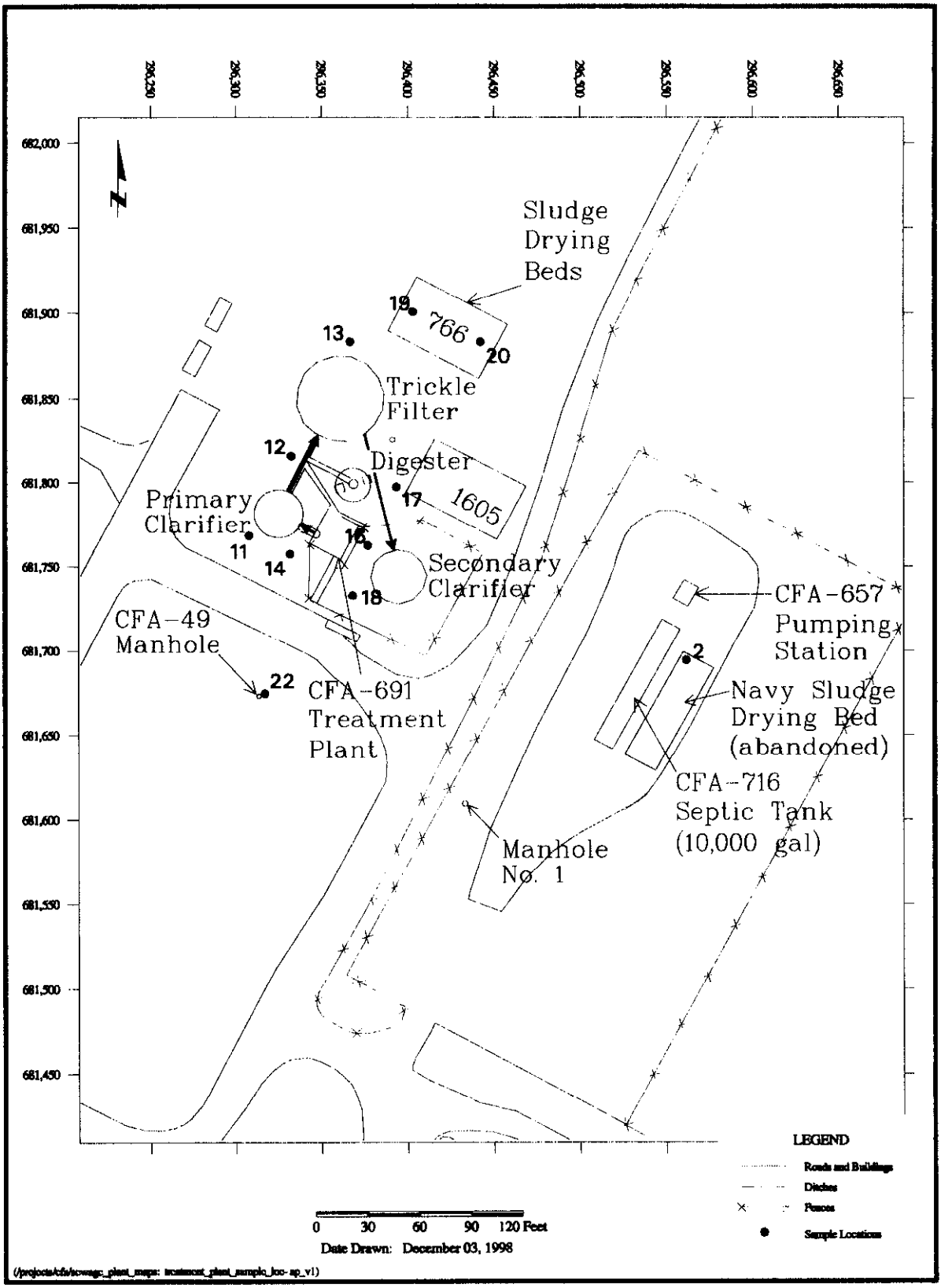

Figure 3-4. Sample locations at the CFA-08 Sewage Treatment Plant.

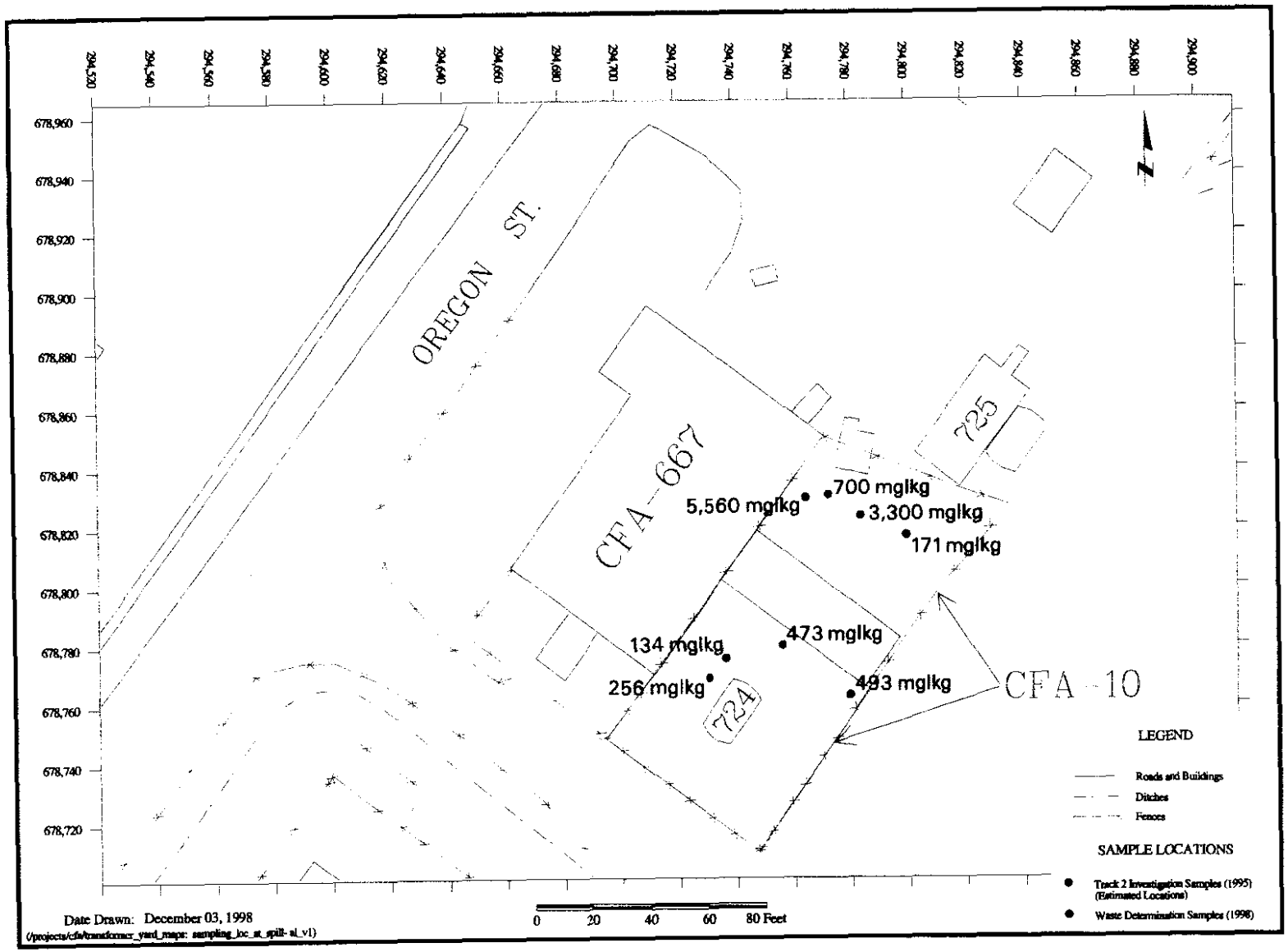

Figure 3-5. Sample locations at CFA-10 (1998).

2. Determine the waste status of lead-contaminated soil.

These objectives were met with the collection of 13 samples from 4 locations and analyzed for total lead and TCLP lead analysis. A sample was collected at depths of 0 to 0.5 ft, 1.0 ft, and 2.0 ft at each of the four locations. One duplicate sample was collected. No critical samples were identified for this sampling activity.

3.4 Miscellaneous Sites Non-time Critical Removal Action

A non-time critical removal action was conducted at the following sites in 1997: CFA-13 Drywell, CFA-15 Drywell, CFA-17/-47 Fire Department Training Area, and CFA-42 Tank Farm Pump Station Spills (DOE 1997). This action mitigated the risks identified in the Track 2 investigations at these sites (Wells 1997).

The overall objectives were to:

- Prevent exposure to radioactive materials posing future residential excess cancer risk levels (cumulative for all radioactive COCs) greater than a 10^{-6} to 10^{-4} range.
- Prevent ingestion of contaminated soils posing a total cancer risk level (cumulative for all COCs) greater than a 10^{-6} to 10^{-4} range, resulting in a total HQ greater than 1.
- Prevent inhalation of suspended radioactive materials posing excess risk levels (cumulative for all radioactive COCs) greater than a 10^{-6} to 10^{-4} range.
- Provide a mechanism for all disposition of soils at the different sites and meet all cleanup levels so that no additional remedial actions will be required at any of the sites.
- Minimize contaminated waste soils generated during soil removal activities through the use of field screening.
- Complete the project with no safety, industrial hygiene, or environmental incidents.

3.4.1 CFA-13 Dry Well (South of CFA-640)

3.4.1.1 Site Summary. This site consisted of a dry well thought to be located south of Building CFA-640. Building CFA-640 was built in 1950 and demolished in 1995, provided offices for Security and Power Management, a small area for physical fitness, a line crew craft area, an automobile repair garage, and a locomotive repair area. The dry well was not located during the Track 1 investigation and it was recommended that no further action be taken at the site. Further evidence of the dry well was discovered during demolition of the building, when a floor drain in the former garage area was discovered. The drain was connected to a buried pipe located along the outside south wall of the building. The pipe angled away from the building, where it was cut and sealed. It was believed, at that time, that this pipe may have been connected to the CFA-13 dry well and that contaminants may have been discharged to it via the floor drain. A non-time critical removal action was initiated as a result of this discovery to locate and remove the drywell.

3.4.1.2 Removal Action Activities. The area where the CFA-13 Dry Well was thought to be located was excavated along the pipe to a depth of approximately 1.8 m (6 ft) during the 1997 removal

action. A structure was found and determined to be a sewer clean out box. Samples were collected from under the box and from inside the piping prior to removal of the structures in accordance with the Field Sampling Plan (FSP) (Wells, 1997). The clean out box and approximately 9 m (30 ft) of piping were removed. It was determined that the piping would be handled as asbestos piping and removal would be performed per LMITCO Management Control Procedures 2859 and 2862. The material was disposed at the CFA Bulky Waste Landfill. The excavation was backfilled, graded, and compacted. Samples were collected from the soil beneath the dry well and analyzed for radionuclides, metals, VOCs, SVOCs, and underlying hazardous constituents. The analytical data indicated that no contaminants of concern were detected above background concentrations. Analytical data from samples collected from the material in the clean out box and piping indicate no contaminants were detected above background concentrations. The objective of sample collection was to define the nature and extent of contamination and verify that all contaminants were removed from the site. The objective was fulfilled by collection of samples from locations beneath the structure and piping where contamination would have most likely occurred.

3.4.2 CFA-15 Dry Well

3.4.2.1 Site Summary. This site consisted of a dry well 0.6m (2 ft) in diameter located on the northwest side of Building CFA-674. Documentation related to the purpose of the dry well was not found during the Track 1 investigation and it was believed that no contaminants were discharged to the well. The conclusion of the Track 1 investigation was that no further action would be taken at the site. Further investigation of the nearby CFA-04 Pond determined that hazardous wastes were used in the CFA-674 Building and there was a possibility that these were discharged to the dry well. CFA-15 was included in the removal action as a result of this information.

3.4.2.2 Removal Action Activities. The soil surrounding the dry well was excavated to a depth of approximately 2.4 m (8 ft). The pipe connecting the drywell to the west wall of CFA-674 was cut and dry-packed with grout. Soil samples were collected in accordance with the FSP (Wells, 1997). Characterization data, collected from inside the dry well, indicated no radioactive contamination above INEEL background concentrations. However, INEEL procedures require that the pipe could not be released and it was therefore labeled as being potentially radiologically contaminated and buried in place. The dry well was removed and disposed at the CFA Bulky Waste Landfill. The excavation was backfilled and compacted. Soil samples were collected and analyzed for radionuclides, target analyte list, metals, VOCs, and SVOCs prior to removal of the dry well. Samples were also analyzed for underlying hazardous constituents including, TCLP metals, PCBs, herbicides, pesticides, and dioxins. Analytical data indicated no contaminants present at the drywell site above background concentrations. The objective of sample collection was to define the nature and extent of contamination and verify that all contaminants were removed from the site. The objective was fulfilled by collection of samples from locations beneath the structure and piping where contamination would have most likely occurred.

3.4.3 CFA-17 Fire Department Training Area and CFA-47 Chemical Disposal Area

3.4.3.1 Site Summary. The CFA-17 Fire Department Training Area and CFA-47 Chemical Disposal Area are located approximately 6 km (4 mi) north of CFA. The areas were used by the fire department since 1958 to train fire department personnel. The training area consisted of an asphalt pad, concrete and steel burn basins, and a drainage pond. CFA-47, located near the fire training area, is the location of terphenyl and trinitrotoluene contamination.

The non-time critical removal action was planned using data collected from the Track 2 Investigation performed in 1995. The total amount of petroleum contaminated soil removed from the site was 4,051 m^3 (5,298 yd^3) to depths ranging from 3 to 7 m (10 to 24 ft). Additional samples were collected prior to excavation of contaminated soil. Data from these samples indicated the presence of

polynuclear aromatic hydrocarbons (PAHs), BTEX, arsenic, calcium, lead, mercury, silver, and terphenyl. Additional samples were collected from areas where contaminated soil was removed. The objective of sample collection was to define the nature and extent of contamination and verify that all contaminants were removed from the site. The objective was fulfilled by collection of samples from locations beneath the asphalt pad and structures where contamination would have most likely occurred. Data from the samples that indicated detections of contaminants were collected from locations directly on the basalt surface. Contaminants are likely to be present in the basalt beneath areas where detections occurred.

3.4.4 CFA-42 Tank Farm Pump Station Spills

3.4.4.1 Site Summary. This site consisted of petroleum-contaminated soil from seven above ground petroleum storage tanks, a pump station, piping, catch basins, and a fueling rack. A time-critical removal action performed in 1996 revealed extensive subsurface contamination under the fueling racks. This initial action at the site was focused on visible surface contamination at the fueling racks. Extensive subsurface petroleum contamination was discovered during this action and consequently a non-time critical removal action was performed to complete the remediation of the site.

3.4.4.2 Removal Action Activities. The objective of the time critical removal action, performed in 1996, was to remove subsurface petroleum-contaminated soil in the vicinity of the catch basins. Approximately 1,592 m^3 (2,083 yd^3) of contaminated soil was removed and treated at the CFA Landfarm. Contaminated soil was removed to the cleanup level of 1,000 mg/kg TPH. Two of the fueling racks were also removed. Evidence of additional contamination was discovered during this action, consequently, an additional non-time critical removal action was performed in 1997. Approximately 4,921 m^3 (6,437 yd^3) of contaminated soil was removed during this action. The petroleum-contaminated soil was disposed at the CFA Landfarm for treatment. All structures at the site, including the pump station, seven tanks, piping, and the fueling rack were removed and disposed. The site was filled, compacted, and regraded with clean soil. The road, which was removed, was replaced in 1998.

Seventeen boreholes were drilled at CFA-42, during the 1997 removal action, to confirm or deny the presence of petroleum hydrocarbons. Petroleum contamination was detected in several borings with one sample higher than cleanup levels. Levels used were taken from Risk-Based Corrective Action for Petroleum Sites (Idaho 1996). The contaminated sample was collected from a subsurface location between the fuel rack and pump house. The objective of sample collection was to define the nature and extent of contamination and verify that all contaminants were removed from the site. The objective was fulfilled by collection of samples from locations beneath the tanks, piping, and structures where contamination would have most likely occurred. Confirmation samples were collected in and around the pump house, fill station, and the tanks during the action. Data indicate that all contaminated soil above basalt was removed. Data from samples collected on the surface of basalt also indicate that petroleum contamination remains within basalt.

3.5 Precision and Accuracy

This section present a discussion of the precision and accuracy associated with data collected during the removal actions. Spatial variations are present in measured contaminant concentrations, creating variability in measurements. The measured concentration represents the true concentration plus the measurement error. The contribution of measurement error to the total error is assessed in this section. Analytical data from quality control samples was used to estimate accuracy and precision, quantitative estimators of measurement error, and bias.

3.5.1 Overall Precision

Precision is a measure of the reproducibility of measurements under a given set of conditions. Precision is affected by sample collection procedures at the site and the natural heterogeneity of the soil. Duplicate samples were collected at the CFA-04 Pond, CFA-08 Drainfield, and the removal action sites. The relative percent difference (RPD) was calculated for each analyte detected at CFA-04 and CFA-08 sites.

CFA-04 Pond (1997)—Six duplicate samples were collected at the CFA-04 Pond. Sample analyses included metals, nitrates, gamma spectroscopy, and uranium isotopes. The RPD for these analyses ranged from 0 to 12.5% for metals, 0.2 to 6.5% for uranium isotopes, and was 1.4% for the one nitrate analysis. All other analyses indicated non-detectable values.

CFA-04 Pond (1998)—Six duplicate samples were collected at CFA-04 in 1998. Analysis was performed for mercury. The RPD for these analyses ranged from 0 to 11.5%.

CFA-08 Drainfield—Five duplicate samples were collected at CFA-08. Sample analyses included metals, nitrates, gamma spectroscopy, and uranium isotopes. The RPD for these analyses ranged from 0 to 38.3% for metals, 3.1 to 7.8% for gamma spectroscopy, and 0 to 25% for nitrate analyses. All other analyses indicated non-detectable values.

CFA-10 (1998)—Two duplicate samples were collected at CFA-10 and analyzed for lead. The RPD for these analyses ranged from 0 to 2%.

CFA-13—One duplicate sample was collected and analyzed for radiological contaminants. The RPD for the detectable radiological constituents was 14.2% for Ra-226, 2.4% for U-234, 8.1% for U-235, and 3.6% for U 238. All other analyses indicated non-detectable values.

CFA-15—Two duplicate samples were collected and analyzed for radiological contaminants. The RPD for the detectable radiological constituents was 7.8% for Ra-226, 7.0% for U-234, 12.1% for U-235, and 3.6% for U 238. All other analyses indicated non-detectable values.

CFA-42—One duplicate sample was collected and analyzed for radiological contaminants. No compounds were detected in the analyses, consequently the RPD could not be calculated.

CFA-17/-47—Three duplicate samples were collected and analyzed for BTEX and PAH compounds. No compounds were detected in the analyses, consequently the RPD could not be calculated.

3.5.2 Overall Accuracy

Accuracy is a measure of bias in a measurement system. The field collection parameters that affect accuracy are sample preservation and handling, field contamination, and the sample matrix. The effects of the first three parameters are assessed through evaluating the field and equipment blank data. Two rinsate samples were collected at the CFA-08 Drainfield. The samples were analyzed for metals, nitrates, gamma spectroscopy, VOC, SVOC, and uranium isotopes. Two metals (calcium at 25.7 ug/L and iron at 12.9 ug/L) and U-235 (11.5 pCi/L) were detected in one of the samples. The other samples contained sodium (47.8 ug/L). All other analytical data indicated non-detectable values. These results indicate that minimal contamination of rinsate samples may have occurred from the contaminants above, however, there is no bias that would affect the intended use of the data.

3.5.3 Laboratory Precision and Accuracy

The laboratory precision and accuracy requirements are part of the validation criteria against which laboratory data are evaluated. Laboratory precision is estimated through the use of spiked samples and/or laboratory control samples. The number of laboratory QC samples are specified in the analytical methods used in the LMITCO Sample Management Office statement of work or task order. Evaluation criteria for the QC samples are specified in LMITCO SMO data validation TPRs. CLP Samples are also evaluated in accordance with this protocol.

A review of the data indicates that laboratory indicators and parameters were in control for positive detections. Some laboratory indicators and parameters were in control for "U" or "UJ" flagged data that do not affect the use of the data in the BRA. Additional information on the validation of the OU 4-13 and removal action data can be found in limitations and validations reports.

3.6 Completeness

Completeness is a measure of the quantity of usable data collected during an investigation. The completeness goal includes field sample completeness (factors such as equipment and instrument malfunctions and insufficient sample recovery) and analytical completeness, which includes factors such as damage during sample handling, shipping, packing, and storage. The QAPjP (LMITCO 1997) requires overall completeness goal of 90% for data collected during an RI/FS. If critical parameters or samples are identified, a 100% completeness goal is specified in the QAPjP.

3.6.1 OU 4-13 CFA-04 and CFA-08

The objectives for the number and locations of critical samples, identified in the SAP, at CFA-04 were met as follows:

- CFA-04 Pond; 3 randomly located samples
- Piping from building CFA-674; 1 sample
- Northern anomaly; all samples from locations #9 and #15
- Western anomaly; all samples from location #2.

The percentage of completeness for FSP planned samples is 100% (Table 3-1), which is greater than the required 90% completion. The laboratory holding period was exceeded for 14 samples collected from the western anomaly and consequently received an "r" flag. Additional samples were collected from these locations and analyzed for nitrates to replace the rejected data, which results in 100% completeness for nitrates. The "r" flagged nitrate data range in values from 0.45 to 2 mg/kg. The replacement data rage in values from 0.6 to 90 mg/kg, which is an order of magnitude higher.

The objectives for the number and locations of critical samples collected at CFA-08 were met with the collection of the required number of critical samples from the drainfield. The following number of analyses were required for these samples; arsenic–3 samples, Cs-137–6 samples, and U-238–13 samples. The percentage of overall completeness for FSP planned samples is 100%.

Table 3-1.

	Inorganic				Organic						Radiological								
Completeness	Metals	As	Hg	Nitrate	VOA	SVOA	PCB	PAH	TPH	All	^{137}Cs	^{234}U	^{235}U	^{238}U	^{241}Am	^{60}Co	$^{152/154}Eu$	$^{239/240}Pu$	^{90}Sr
CFA-04 Pond (OU 4-13—1997)																			
Samples	29	95	136	44	18	14	9			17	25	46	69	46					
Acceptable Data	29	95	136	44	18	14	9			17	25	46	69	46					
% Complete	100%	100%	100%	100%	100%	100%	100%			100%	100%	100%	100%	100%					
CFA-04 Pond OU 4-13 RI/FS—1998																			
Samples			91																
Acceptable Data			91																
% Complete			100%																
CFA-08 Drainfield (Mercury Retort Staging Area)																			
Samples	48																		
Acceptable Data	48																		
% Complete	100%																		
CFA-08 Drainfield																			
Samples	31			51		28	28				65	32	81	33	75	63	49	27	
Acceptable Data	31			51		28	28				65	32	81	33	75	63	49	27	
% Complete	100%			100%		100%	100%				100%	100%	100%	100%	100%	100%	100%	100%	
CFA-08 Pipeline																			
Samples	10			28			10			3			6						28
Acceptable Data	10			28			10			3			6						28
% Complete	100%			100%			100%			100%			100%						100%
CFA-08 Sewage Treatment Plant																			
Samples	12			51		8	8			13			26		26				
Acceptable Data	12			51		8	8			13			26		26				
% Complete	100%			100%		100%	100%			100%			100%		100%				

Table 3-1. (continued).

	Inorganic				Organic						Radiological								
Completeness	Metals	As	Hg	Nitrate	VOA	SVOA	PCB	PAH	TPH	All	^{137}Cs	^{234}U	^{235}U	^{238}U	^{241}Am	^{60}Co	$^{152/154}Eu$	$^{239/240}Pu$	^{90}Sr
CFA-10 Yard (1997 and 1998)																			
Samples	15						6												
Acceptable Data	15						6												
% Complete	100%						100%												
CFA-13 Drywell																			
Samples	6				10		2	6		7			14		14				
Acceptable Data	6				10		2	6		7			14		14				
% Complete	100%				100%		100%	100%		100%			100%		100%				
CFA-15 Drywell																			
Samples	6				5	6	2	6		6			12		12				
Acceptable Data	6				5	6	2	6		6			12		12				
% Complete	100%				100%	100%	100%	100%		100%			100%		100%				
CFA-17/-47 Fire Station																			
Samples					32			43											
Acceptable Data					32			43											
% Complete					100%			100%											
CFA-26 Spill																			
Samples					6	6			6										
Acceptable Data					6	6			6										
% Complete					100%	100%			100%										
CFA-42 Tank Farm																			
Samples					40			42											
Acceptable Data					40			42											
% Complete					100%			100%											

3.6.2 Non-time Critical Removal Actions (1997)

Sampling was performed during the Non-time critical removal action at the CFA-13 Drywell, CFA-15 Drywell, CFA-42 Tank Farm, and CFA-17/-47 Fire Department Training Area.

CFA-13 Drywell. Samples were collected and analyzed for radionuclides, metals, VOCs, SVOCs. The percentage of completeness for FSP planned samples is 100%. Data from these samples indicated that no contaminants were detected above background concentrations. The analyses for all samples resulted in acceptable data with the following exceptions. Data considered unusable (flagged "r") included the following analytes in the VOC analysis (acrylamide, idomethane, isobutyl alcohol, N-butanol) due to failure to meet minimum laboratory requirements for instrument calibration.

CFA-15 Drywell. Samples were collected and analyzed for radionuclides, metals, PAHs, VOCs, SVOCs, herbicides, and pesticides. The percentage of completeness for FSP planned samples ranges from 78 to 100 percent, which is less than the required 90% (Table 3-1). The full set of planned samples were not collected during the action because data from samples collected prior to the excavation indicated no contamination. The number of planned samples was determined assuming that contaminants would be present in and around the drywell, consequently, fewer samples were collected Analytical data considered unusable (flagged "r") included the following analytes in the VOC analyses (acrolein, idomethane, isobutyl alcohol, N-butanol) due to failure to meet minimum laboratory requirements for instrument calibration.

CFA-42 Tank Farm Pump Station Spills. Samples were collected and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX), and PAHs. The percentage of completeness for FSP planned samples ranges is 100%.

CFA-17/-47 Fire Station. Samples were collected and analyzed for BTEX and PAHs. The percentage of completeness for FSP planned samples 100 percent.

3.6.3 Detection Limits

The analytical data from these investigations are used in Section 6 to complete a BRA and characterize the type and extent of contamination. Acceptable detection limits for organic compounds are based on regulatory or risk-based levels. The laboratory reports all positive results for analyzed compounds even if they are less than the Contract Required Quantitation Limit (CRQL). Unless the results are rejected as unusable during data validation, all results are used to characterize the nature and extent of contamination and the risk. Compounds that are detected below the CRQL are estimated values and are generally flagged "J". CRQLs are chemical and sample matrix-specific concentrations that a laboratory must be able to routinely and reliably detect and quantify when using the analytical method specified in the CLP SOWs. Analytical data with validation flags attached are contained in Appendix B.

3.7 Comparability and Representativeness

Comparability is the confidence with which one data set can be compared to another. Data comparability is a qualitative characteristic that is achieved using standard field and analytical methods and procedures related to the areas discussed below. Field collection and sampling handling methods used at OU 4-13 and removal action sites was conducted in accordance with the procedures and requirements in the QAPjP (LMITCO 1997) and the FSPs. Field and laboratory QA/QC procedures were consistent in both the OU 4-13 and removal actions. Data collected at these sites is therefore comparable for the purpose of the BRA.

Representativeness is a qualitative parameter that expresses the degree to which the analytical data reflect the characteristics being measured. Representativeness is best evaluated by comparing the number of samples collected to the number necessary to be representative and by confirming that the sample locations were properly located. The required number of samples were collected at CFA-04 and CFA-08 for these data to be considered representative of the conditions present at these sites. The location of all samples was documented in the topographic survey.

Data collected at the removal action sites is also considered to be representative of clean site conditions after contamination was removed. The extent of contamination in the vadose zone above basalt was determined by removal of contaminated soil and subsequent sample collection in undisturbed soil. Samples were collected from biased locations where contaminants would be expected to be present, based on known contamination areas.

3.8 References

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